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EXAMINER	
CALANDRA, ANTHONY J	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/577,434	BENAOUDIA ET AL.
	Examiner	Art Unit
	ANTHONY J. CALANDRA	1791

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *4/27/06* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Detailed Office Action

1. The communication dated 4/27/2006 has been entered and fully considered.

2. Claims 1-13 are currently pending.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1-5, 7, 9-11 are rejected under 35 U.S.C. 102(b) as being anticipated by 10/26/03-10/30/03 *TAPPI Fall Technical Conference: Engineering, Pulping &PCE&I Conference CD Paper:* ***Chip Properties Analysis for Predicting Bleaching agents Requirements for TMP Pulps*** by LAPERRIERE et al., hereinafter LAPERRIERE.

As for claim 1, LAPERRIERE discloses a method for optimizing TMP pulp production brightness by changing peroxide levels based on chip qualities fed into a neural network (*A method for estimating an optimal dosage of bleaching agent to be used in a process for producing pulp of a required brightness value from wood chips* [abstract]). LAPERRIERE estimates several chip qualities including chip brightness which is a reflectance property (*estimating a set of wood chip properties characterizing said wood chips to generate corresponding wood chip properties data, said set including reflectance-related properties* [section 2.2]). LAPERRIERE then discloses building a database of 178 parameters from properties coming from the chips, the TMP and bleach process and the pulp quality characteristics. LAPERRIERE then discloses that 5 different peroxide charges are used during

the experiments. After data screening a predictive model was built which allowed for the prediction of brightness based on the chip qualities and peroxide charge (*providing an initial dosage value of said bleaching agent; and feeding said wood chip properties data and said bleaching agent dosage value at corresponding inputs of a predictive model (10) for generating predicted brightness value of pulp to produce from said wood chips, to estimate the optimal bleaching agent dosage for which said predicted brightness value substantially reaches said required brightness value, wherein said predictive model estimate the optimal bleaching agent dosage by performing the steps of analysis* [section 3.1, 3.2 and Figures 3 and 4]). LAPERRIERE then discloses comparing the error generated in a neural network system to the brightness set point (*comparing said brightness predicted value with said required brightness value to generate error data* [section 3.3 and figure 5]). LAPERRIER teaches that the neural network has an optimization loop to which the error information is fed (*optimizing said bleaching agent dosage value to minimize said error data* [section 3.3 and Figures5]). LAPERRIER then discloses that process takes place over several iterations (*repeatedly generating predicted brightness value and performing said steps a) and b) with the optimized bleaching agent dosage value until said predicted brightness value substantially reaches said required brightness value, to estimate said optimal bleaching agent dosage* [section 3.3 and figure 5]).

As for claim 2 and 3, LAPERRIER discloses both chip size and moisture as an input property [Figure 5, Table 4, section 2.2, 3.2].

As for claim 4, LAPERRIER discloses that the predictive model includes a neural network which has been trained with experimentally obtained data [abstract, section 3 data analysis].

As for claim 5, LAPERRIER discloses refining the pulp and then and then bleaching the pulp with an optimum amount of peroxide [Sections 2.1 and 3.3].

As for claim 7, LAPERRIER discloses feeding the error signal back into the optimization module and performing several iterations and then taking corrective action on peroxide charge [section 3.3 and figure 5].

As for claim 9, examiner recognizes that applicant has attempted to invoke 112 6^{th} paragraph by using the ‘means for language’. Examiner has interpreted the ‘means for estimating a set of wood chip properties’ as a CMS or functional equivalent. Applicant does not explicitly disclose what the ‘means for comparing’ or ‘means for optimizing’ are other than software running on a computer and as such examiner has interpreted such means as software programs/advanced control programs which include a neural network. LAPPIERER discloses a means for estimating a set of wood chip parameters, specifically a CMS [Figure 5]. LAPIERER further discloses data processor means implementing a predictive model receiving at corresponding inputs thereof said wood chip properties data and an initial bleaching agent dosage value for generating predicted brightness value of pulp to produce from said wood chips, to estimate the optimal bleaching agent dosage for which said predicted brightness value substantially reaches said required brightness value [Figure 5]. LAPPIERRER discloses means for comparing said brightness predicted value with said required brightness value to generate

error data [Figure 5] and means for optimizing said bleaching agent dosage value to minimize said error data [Figure 5]

As for claim 10, LAPERRIER discloses that the predictive model comprised a previously trained neural network [section 3.2].

As for claim 11, examiner notes that applicant has invoked 112 6th paragraph by using the 'means for language'. Examiner has interpreted the 'means for adding a bleaching agent' to be a pipe and control valve run by a control system. LAPERRIER discloses a system based on the apparatus of claim 9 [see above], which includes the steps of refining the chips and a control system for adding bleaching chemical to the refined chips according to the optimal bleaching dosage [section 2.1, 4.3, conclusions]. LAPERRIER shows a control valve and piping system in figure 6 which would be capable of adding bleaching chemicals.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 6, 8, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over 10/26/03-10/30/03 *TAPPI Fall Technical Conference: Engineering, Pulping &PCE&I Conference CD Paper:* ***Chip Properties Analysis for Predicting Bleaching agents Requirements for TMP Pulps*** by LAPPERRIERE et al., hereinafter LAPERRIERE, in view of U.S. 2003/0149493 BLEVINS et al., hereinafter BLEVINS as evidenced by *Quality Prediction by Neural Network for Pulp and Paper Processes* by KIM et al., hereinafter KIM..

As for claim 6 and 7, LAPERRIERE does not explicitly disclose an attenuation of estimated wood chip properties caused by a time delay. However, to have accurate modeled correlation data it is necessary to have such a delay. Without such a delay the predicted brightness would be based on the input parameters for the wrong chips since there are multiple processing steps in between chip property measurement and pulp brightness measurement including refining as disclosed by LAPERRIERE (i.e. no delay the predicted brightness would be based on chips that are just being tested and haven't been refined yet and thus give inaccurate results). As such it would have been obvious to a person of ordinary skill in the art to optimize the time of delay signal such that the measured chip quality inputs matched with when the same chips that were subject to bleaching such that more accurate data/results would be obtained. Further, people of ordinary skill in the art recognize time delay as an important variable which neural networks can handle [KIM pg. 105 paragraph 2 and 3]. Alternatively, BLEVINS discloses the use of a variable time delay that can account for delays in process when using model predictive control [abstract]. It is *prima facie* obvious to apply one known technique such as time delay of BLEVINS to the known neural network predictive control system of LAPERRIERE. The time delay would predictably provide more accurate process control. Both

BLEVINS and LAPERRIERE teach advanced control methods, further both BLEVINS and LAPERRIERE deal with brightness control. With the inclusion of time-delay processing LAPERRIER would continue to feed the error signal back into the optimization module and performing several iterations and then taking corrective action on peroxide charge with the advanced time control attenuation [section 3.3 and figure 5].

As for claims 12 and 13, examiner notes that applicant has invoked 112 6th paragraph by using the ‘means for language’. Examiner has interpreted the ‘means for adding a bleaching agent’ to be a pipe and control valve run by a control system. Applicant does not explicitly discloses in the specification what the ‘means for estimating’, ‘means for time delaying’, ‘means for time delaying’ are other than software running on a computer and as such examiner has interpreted such means as software programs/advanced control programs which include a neural network.

LAPERRIERE does not explicitly disclose time delay means. However, it is the position of the examiner that the computer as described by LAPERRIERE would be capable of adding a time delay. Further, to have accurate modeled correlation data it is necessary to have such a delay. Without such a delay the predicted brightness would be based on the input parameters for the wrong chips since there are multiple processing steps in between chip property measurement and pulp brightness measurement, including refining as disclosed by LAPERRIERE (i.e. no delay the predicted brightness would be based on chips that are just being tested and haven’t been refined yet and thus give inaccurate results). As such it would have been obvious to a person of ordinary skill in the art to optimize the time of delay signal such that the measured chip quality inputs matched with when the same chips that were subject to bleaching such that more

accurate data/results would be obtained. Further, people of ordinary skill in the art recognize time delay as an important variable which neural networks can handle as evidenced by [KIM pg. 105 paragraph 2 and 3]. Alternatively, BLEVINS discloses the use of a variable time delay that can account for delays in process when using model predictive control [abstract]. It is *prima facie* obvious to apply one known technique such as time delay of BLEVINS to the known neural network predictive control system of LAPERRIERE. The time delay would predictably provide more accurate process control. Both BLEVINS and LAPERRIERE teach advanced control systems, further both BLEVINS and LAPERRIERE deal with brightness control. With the inclusion of time-delay processing LAPERRIER would continue to feed the error signal back into the optimization module and performing several iterations and then taking corrective action on peroxide charge with the advanced time control attenuation [section 3.3 and figure 5]. LAPERRIER further discloses means for comparing, a predictive model and means for adding a bleaching agent [Figure 5].

8. Claim 1-5, 7, 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Integrated Intelligent Control System for Peroxide Bleaching Processes* by XIA et al., hereinafter XIA, in view of *Economizing the Bleaching Agent Consumption by Controlling Wood Chip Brightness* by DING et al., hereinafter DING.

As for claim 1, XIA discloses wood species and chip quality as important affective variables which effect brightness [pg. 594]. XIA does not disclose specifically measuring reflectance related data of wood chips. Examiner notes that wood species has a very large effect on reflectance of wood chips (cherry wood is much darker than say balsa wood). DING discloses a system that is capable of measuring wood chip reflectance data and that said data

effects brightness after bleaching [abstract, Conclusion]. At the time of the invention it would have been *prima facie* obvious for a person of ordinary skill in the art to apply a known measurement system such as taught by DING to a control system taught by XIA. Both XIA and DING look to control pulp brightness resultant from bleaching of mechanical pulp. The chip measurement taught by DING would have the predictable result of improving the neural network modeling of XIA.

XIA discloses a control system which is capable of controlling multiple affecting factors such as caustic, peroxide and silicate through the use of a neural network containing intelligent control system [abstract, pg. 594]. XIA discloses a method to control quality parameters such as brightness, freeness and bulk [594]. While XIA discloses both peroxide and chip quality as effecting factors and pulp brightness as the quality factor that is being affected it only teaches the use of the system in general. As such, XIA teaches the method steps of the instant claims but does not give the specific example of using peroxide, brightness, and wood chip quality and instead teaches more than just those factors.

XIA discloses initial information being inputted into the computer including peroxide charge [Figure 3] and discloses chip data being fed into the computer [Figure 3]. XIA discloses that the action variable and operational conditions are fed into the matrix simulator which outputs resultant variables. Brightness is shown to be controlled by chip quality and peroxide as two of many factors [Figure 3]. The computer is shown to iteratively repeat measurements [Figure 7] and data collection while monitoring for undesirable conditions and the cause of said conditions (comparing predicted values) and then deciding corrective actions (optimizing the bleaching dosage).

As for claim 2, XIA discloses chip quality [pg. 594]. Wood chip size is a chip quality feature that is important in refining. Large chips will tend to be refined poorly and as such will require more bleaching.

As for claim 3, DING discloses that wood chip moisture effects brightness [conclusion].

As for claim 4, XIA discloses a neural network [abstract]. XIA further discloses that experimental data (lab testing) is fed into the computer system [Figure 1]. Examiner has interpreted the lab testing as the training data for the neural network contained within. Further, XIA discloses continuous training as it shows the matrix simulator continuing to receive data back and forth from the control system [Figure 7].

As for claim 5, XIA does not explicitly state that the wood pulp is made from a refining process; however this is implicit within the reference. XIA discloses that specific energy is an important process variable (kwhr/t) which affects the pulp properties [pg. 594]. Specific energy is a unit of measure used in refining. XIA discloses that the control system is hooked up to the DCS which can control affective factors such as peroxide, caustic, and silicate charge.

As for claim 9, examiner recognizes that applicant has attempted to invoke 112 6th paragraph by using the 'means for language'. Examiner has interpreted the 'means for estimating a set of wood chip properties' as a CMS or functional equivalent. Applicant does not explicitly disclose what the 'means for comparing' or 'means for optimizing' are other than software running on a computer and as such examiner has interpreted such means as software programs/advanced control programs which include a neural network.

XIA discloses an apparatus capable of controlling a pulp bleaching system using a neural network [Figure 2 and abstract]. XIA discloses further discloses data processor means

implementing a predictive model receiving at corresponding inputs thereof said wood chip properties data and an initial bleaching agent dosage value for generating predicted brightness value of pulp to produce from said wood chips, to estimate the optimal bleaching agent dosage for which said predicted brightness value substantially reaches said required brightness value [abstract, pg.1 Architecture of IOMCS, Figure 3]. It is the examiners position that the software and computer neural network of XIA includes a' means for comparing' and a 'means for optimizing' in its software module.

XIA discloses that the properties of wood species and chip quality are measured and effect final pulp quality but does not disclose how they are measured [pg. 594]. DING discloses a CMS system that is capable of measuring chip properties [abstract]. At the time of the invention it would have been *prima facie* obvious for a person of ordinary skill in the art to use the CMS system of DING with the neural network of XIA. It is obvious to apply a known measurement technique of a CMS to a known device such as the neural network of XIA. The CMS system would improve the neural network system of XIA by being able to measure additional chip properties which effect pulp quality such as moisture and brightness.

As for claim 10, XIA discloses that the apparatus includes a neural network [abstract]. Figure 1 shows lab testing (experimentally derived data) information being fed into the computer apparatus containing the neural network [figure 1, abstract], which can control pulp brightness.

As for claim 11, examiner notes that applicant has invoked 112 6th paragraph by using the 'means for language'. Examiner has interpreted the 'means for adding a bleaching agent' to be a pipe and control valve run by a control system. XIA discloses a neural network with the capability for controlling the optimum bleaching agent [abstract, Figure 7]. XIA does not

explicitly disclose that the pulp being sent to bleaching has been refined; however this is implicit in the reference as it states the input parameter of specific energy, kwhr/t, which is a unit of measurement for refiner energy. The future DCS (Digital control system) connection disclosed by XIA is a means for adding bleaching agent to produce bleached pulp [Figure 7]. Control valves and pipes while not disclosed by XIA are well known in the art and used in all modern bleach plants.

9. Claims 6, 8, 12 and 13 rejected under 35 U.S.C. 103(a) as being unpatentable over *Integrated Intelligent Control System for Peroxide Bleaching Processes* by XIA et al., hereinafter XIA, in view of *Economizing the Bleaching Agent Consumption by Controlling Wood Chip Brightness* by DING et al., hereinafter DING, as applied to claims 1-5, 7, 9-10 above, and further in view of U.S. 2003/0149493 BLEVINS et al., hereinafter BLEVINS as evidenced by *Quality Prediction by Neural Network for Pulp and Paper* Processes by KIM et al., hereinafter KIM.

As for claim 6 and 7, XIA does not explicitly disclose an attenuation of estimated wood chip properties caused by a time delay. However, to have accurate modeled correlation data it is necessary to have such a delay. Without such a delay the predicted brightness would be based on the input parameters for the wrong chips since there are multiple processing steps in between chip property measurement and pulp brightness measurement including refining as disclosed by XIA and DING (i.e. no delay the predicted brightness would be based on chips that are just being tested and haven't been refined yet and thus give inaccurate results). As such it would have been obvious to a person of ordinary skill in the art to optimize the time of delay signal such that the measured chip quality inputs matched with when the same chips were subject to bleaching

such that more accurate data/results would be obtained. Further, people of ordinary skill in the art recognize time delay as an important variable which neural networks can handle [KIM pg. 105 paragraph 2 and 3]. Alternatively, BLEVINS discloses the use of a variable time delay that can account for delays in process when using model predictive control [abstract]. It is *prima facie* obvious to apply one known technique such as time delay of BLEVINS to the known neural network predictive control system of XIA and DING. The time delay would predictably provide more accurate process control. Both BLEVINS and LAPERRIERE teach advanced control methods, further both BLEVINS and XIA and DING deal with brightness control. With the inclusion of time-delay processing XIA would continue to feed the error signal back into the optimization module and performing several iterations and then taking corrective action on peroxide charge with the advanced time control attenuation [Figure 7 continuous control system pg. 597 Fault reasoning technique].

As for claims 12 and 13, examiner notes that applicant has invoked 112 6th paragraph by using the 'means for language'. Examiner has interpreted the 'means for adding a bleaching agent' to be a pipe and control valve run by some type of control system. Applicant does not explicitly discloses in the specification what the 'means for estimating', 'means for time delaying', 'means for time delaying' are other than software running on a computer and as such examiner has interpreted such means as software programs/advanced control programs.

XIA does not explicitly disclose time delay means. However, it is the position of the examiner that the computer as described by XIA would be capable of adding a time delay. Further, to have accurate modeled correlation data it is necessary to have such a delay. Without such a delay the predicted brightness would be based on the input parameters for the wrong chips

since there are multiple processing steps in between chip property measurement and pulp brightness measurement including refining as disclosed by XIA (i.e. no delay the predicted brightness would be based on chips that are just being tested and haven't been refined yet and thus give inaccurate results). As such it would have been obvious to a person of ordinary skill in the art to optimize the time of delay signal such that the measured chip quality inputs matched with when the same chips were subject to bleaching such that more accurate data/results would be obtained. Further, people of ordinary skill in the art recognize time delay as an important variable which neural networks can handle as evidenced by [KIM pg. 105 paragraph 2 and 3]. Alternatively, BLEVINS discloses the use of a variable time delay that can account for delays in process when using model predictive control [abstract]. It is *prima facie* obvious to apply one known technique such as time delay of BLEVINS to the known neural network predictive control system of XIA. The time delay would predictably provide more accurate process control. Both BLEVINS and XIA teach advanced control systems, further both BLEVINS and XIA deal with brightness control. With the inclusion of time-delay processing LAPERRIER would continue to feed the error signal back into the optimization module and performing several iterations and then taking corrective action on peroxide charge with the advanced time control attenuation [section 3.3 and figure 5]. XIA further discloses means for comparing, a predictive model and means for adding a bleaching agent [Figure 7].

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. CALANDRA whose telephone number is (571)

270-5124. The examiner can normally be reached on Monday through Thursday, 7:30 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Steven P. Griffin/
Supervisory Patent Examiner, Art Unit 1791

AJC